INSTALLATION PROCEDURE

BEFORE STARTING

- The installation must be calculated and a layout made to determine the materials required.

- Calculations depend on the outside average temperature, insulation values, room size, and type of heating required; i.e., total heat, complementary heat, or floor warming. See Design and Calculation.

- The more specific the layout the easier will be the installation. Indicate for each area:
  - Exact room measurements and fixed fittings.
  - Placement and number of strips of elements.
  - Length and wattage per element strip.
  - Location of power source, including control and power supply(s).
  - Wire size and length according to load and distance to the power source.
  - If required, location of electrical box and terminal block(s).
  - Size of power supply and load distribution on the interface board.

- All specifications must conform to local building codes, ordinances, trade practices, and manufacturers' instructions.

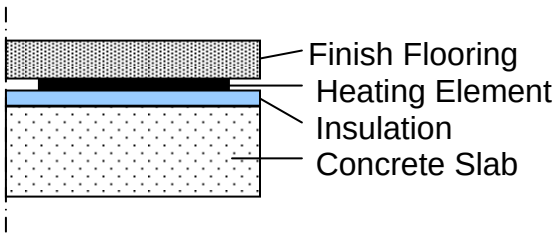
- For energy efficiency, thermal insulation is required under the heating elements. Remember that hot goes to cold, equally in all directions.

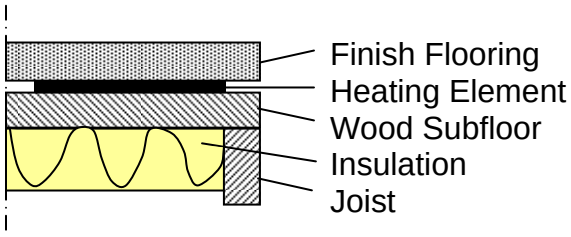
- The heating elements can be installed on any dry, clean, non-conductive, and structurally sound surface.

- Floor temperature should be at least 65^{o}F (18^{o}C) when installing the elements.

- The elements are held down to the subfloor with cement based mortar, latex modified mortar, staples or approved tape. Do not use adhesives, tapes or premix products, unless they are approved by the manufacturer to be compatible with the heating elements.

Installation examples:





POSITIONING THE ELEMENTS

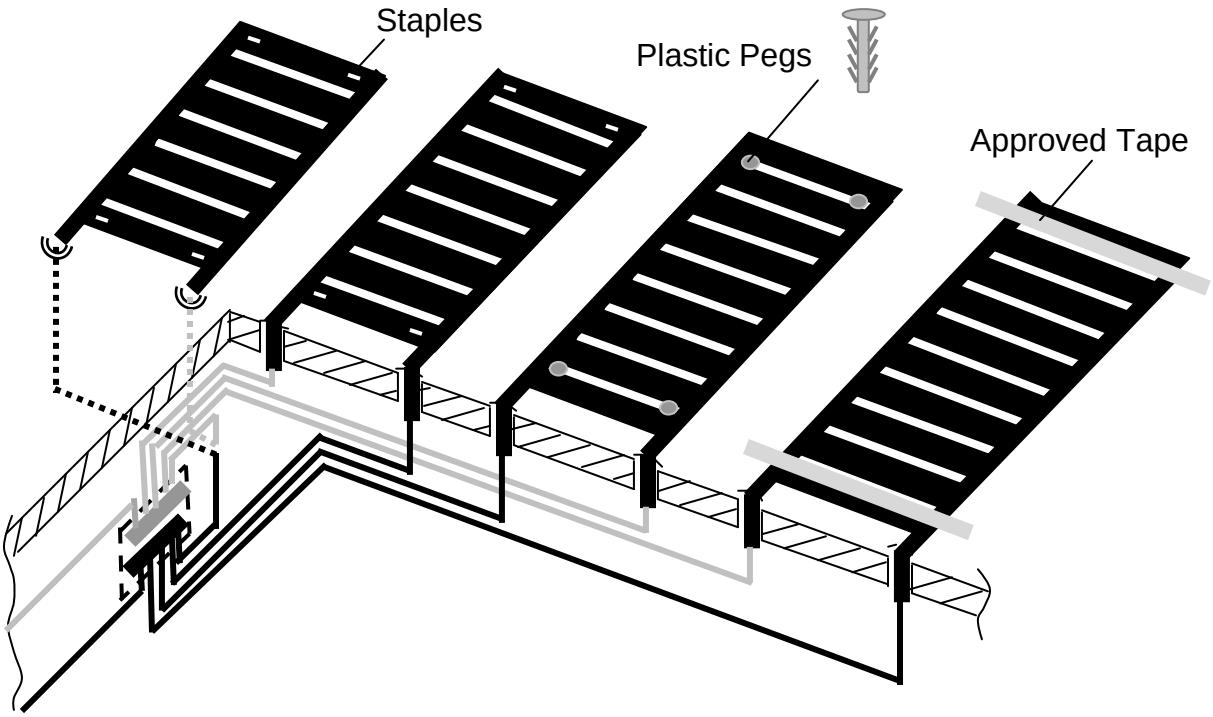
- The heating element comes in a roll. Cut the element with a pair of scissors to the desired length. The maximum length per strip of element is 225 watts; e.g. for element EP-30-2-24W, this would be 29 feet long (8.8 meters).

- The elements must be placed in open spaces and not underneath fixed fittings; such as bookshelves, cupboards, cabinets, etc.

- Minimum distance between elements and from plumbing fixtures is 2 inches (5 cm).

- Choose where the wires will be connected and leave adequate spacing to route them.

- The wires can be connected on the floor, up the wall, under the baseboard, or in raised foundation, under the subfloor



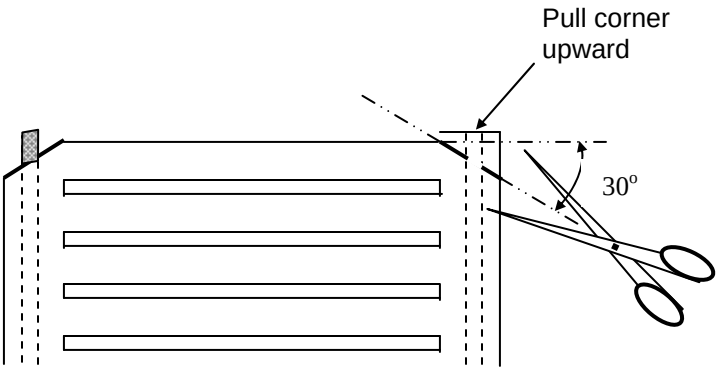
- Stretch each element in position. The elements must lay flat with no air pockets.

- Anchor the elements to the subfloor using staples, plastics pegs or approved tape; secure on one end, stretch, hold, and then secure on the other end.

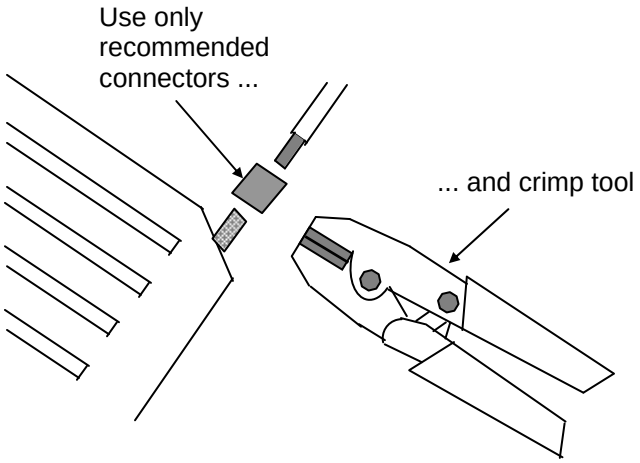
- When securing the elements onto the floor, definitely avoid the bus braids on each side of the element.

- Connect the wires to the elements.

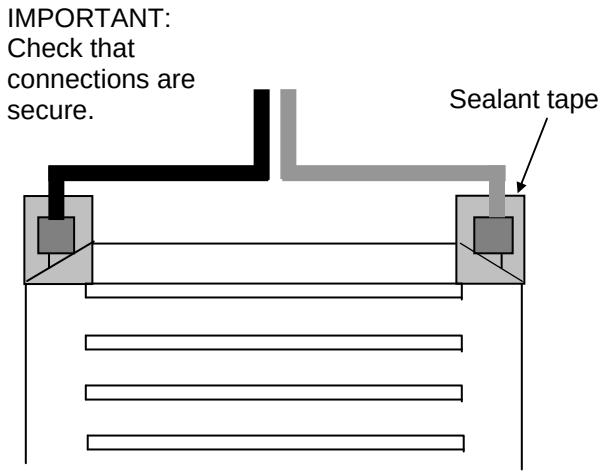
CONNECTING THE WIRES TO THE ELEMENT



- **To expose the two longitudinal bus braids**, cut the plastic on each side of the braid with scissors or make a score in the plastic, front and back, with a knife. Bend the element where the cut is made and pull off the corners to remove the surplus of plastic. Make sure that the bus braid is not cut or damaged. Should this occur, re-cut the element and re-strip the bus braid.



- **Connect the bus braid to an extension wire**, (PVC insulated, stranded tinned copper wire, 105°C, 300V). Crimp the joint using the recommended tinned copper connectors and crimp tool. Using components not recommended by the manufacturer will void the warranty.



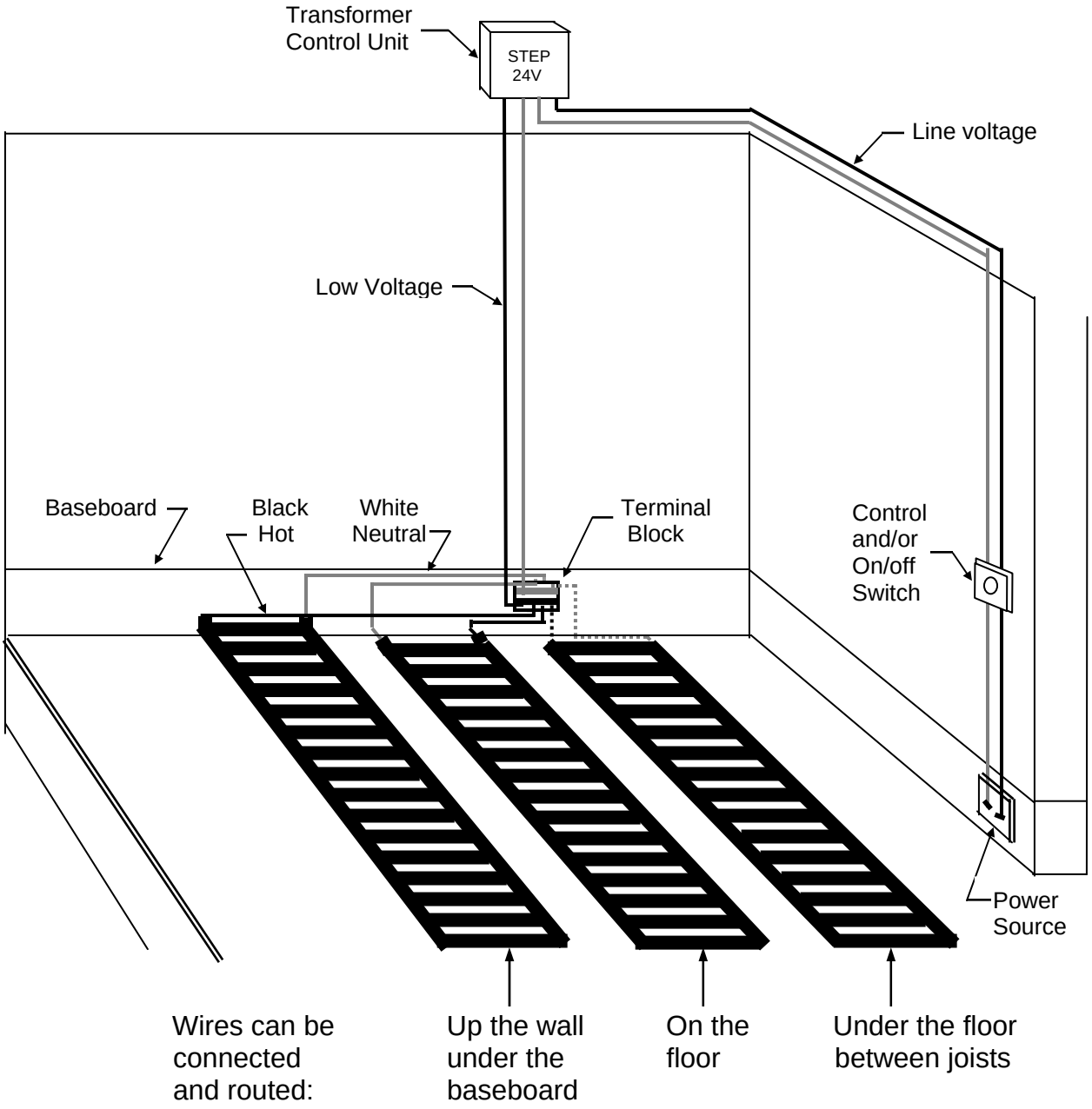
- **To differentiate the polarities supplied to the element**, use two different wire colors (black and white). Insulate the connections using recommended sealant tape. Fold tape and press together overlapping element, connector and wire to form a flat and smooth splice.

ROUTING THE WIRES

- The installation shall be made in accordance to local codes and ordinances. Codes may require special wiring and/or a conduit (plastic or metal) in the walls.

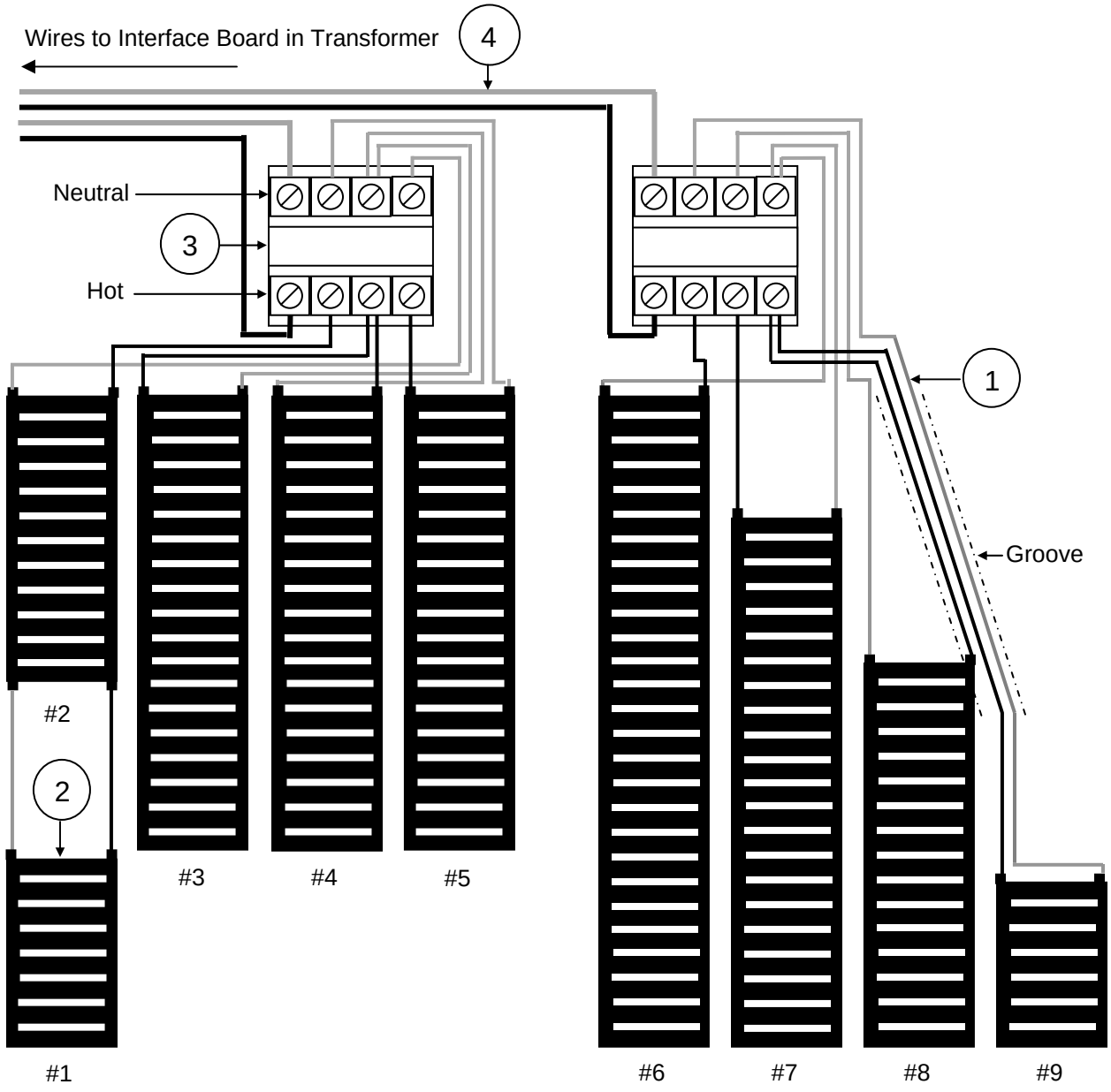
- Plan circuit supply from main panel to on/off switch, control, power supply, terminal block (if needed), and heating elements. Refer to Wiring Diagram, Power Supply Capacity, and Wire Size.

- Power Supply shall be placed vertical on a wall, in the ceiling, under the floor or in a closet, etc., according to NEC code in such a way that heat is dissipated effectively. Make sure that vibration in not transmitted through the wall or structure.



WIRING OPTIONS

IMPORTANT: Refer to Wire Gauge Chart to minimize voltage drop.



(1) When running the wires on the floor, route them neatly and do not allow them to cross one another. Where appropriate, make a groove in the floor to protect and bury the wires. Connections and wires can also run under the floor between joists.

(2) Elements may be linked as long as the added total length does not exceed 450W.

(3) Terminal block(s) may be needed if the power supply is located away from the elements, as this allows using larger wire gauge to minimize voltage drop. Connect all the hot (black) wires to one bus-bar and all the neutral (white) wires to the other bus-bar. Maximum total load per terminal block is 450 watts.

(4) The elements can be routed and connected directly to the interface board on the power supply. Distribute evenly the load from the elements to each circuit breaker; e.g. power supply 500VA = 1 x 450W; 1000VA = 2 x 450W; 1500VA = 3 x 450W.

CONNECTING THE ELEMENTS TO THE POWER SUPPLY

- Each room can have one or more power supplies and if necessary multiple terminal blocks.

- The maximum wattage, on the secondary side, per circuit breaker in the interface board of the power supply is 450 watts (or 18.75 amps on 24V). For example, power supply EPI-LX-500VA has one circuit breaker with a maximum load of 450W; power supply EPI-LX-1000VA has two circuit breakers, thereby two times 450W; and power supply EPI-LX-1500VA has three circuit breakers; thereby three times 450W.

- Minimize voltage drop by planning wire runs as short as possible from elements to power supply. See Wire Size Chart for wire size and length versus load.

- If the power supplies are not close to the elements, instead of using larger wire size in the floor, or running too many or too long wires across the room, the elements can be connected to terminal blocks. Keep each terminal block to maximum 450W and then calculate the appropriate wire size used to run to the power supply.

- Always connect elements in parallel - not in series. Connect same polarity wires together and number each element with its corresponding hot (positive) and common (neutral) wires to facilitate further measurements.

- **IMPORTANT**: A certified electrician has to make a continuity test and measure the amperage for each heating element BEFORE being covered. For guidance, see Electric Resistance Chart.

- Select the 24-Volt power supply(s) that has the capacity to satisfy the load of heating elements installed. Maximum load on the power supply is 90% of its total capacity. For data sheet specifications, see Low-voltage Power Supply.

- The power supply must be installed in a well-ventilated area in accordance with Article 450 of the National Electric Code. Provide sufficient clearance for free flow of air to allow adequate cooling and to eliminate fire hazard. Keep delicate and flammable materials away from the power supply enclosure.

- Choose the appropriate control for the application. For data sheet specifications, see Controls.

- STEP Warmfloor™ Labels shall be provided with the heating product. The following labels should be filled out and affixed in the place indicated:
    - Serial Number label comes on the box and/or on the element.
    - The element comes with a printed or labeled ETL logo.
    - Caution label is to be attached to the junction box.
    - Warning label is to be attached to the service panel.

- For the warranty to be valid send a copy of the layout, indicating distribution and length of elements to ELECTRO PLASTICS, INC. See Warranty.

LEVELING AND COVERING THE FLOOR

- Level the floor in accordance with the trade and the manufacturer's instructions, using mortar, mud bed, building boards, underlayment panels, etc. Do not use adhesives or non approved tapes in direct contact with the elements.

- Codes are revised; new products enter the market and material composition change constantly. It is therefore important to know if these changes comply and/or are compatible with the application.

- Check with the leveling compound and/or building board manufacturer to assure that the material used is appropriate for the given installation.

- To be efficient the heating elements have to be in direct contact with the finished flooring, with no air gaps.

- It is strongly recommended to have thermal insulation under the heating elements.

- Do not place a conductive material in direct contact with the heating elements, i.e., metal mesh, aluminum foil, etc.

- In bathrooms, showers and wet areas, the heating elements shall be installed under a waterproof membrane.

- Respect curing time for concrete, setting materials, grouts, and adhesives.

- To condition the site and acclimatize certain floor coverings, it may be necessary to turn the heating system on. Start with a low heat, and progressively raise the supply temperature until it reaches its maximum temperature.

- The first time the system is switched on; it may take some time until the floor gets to the desired temperature.